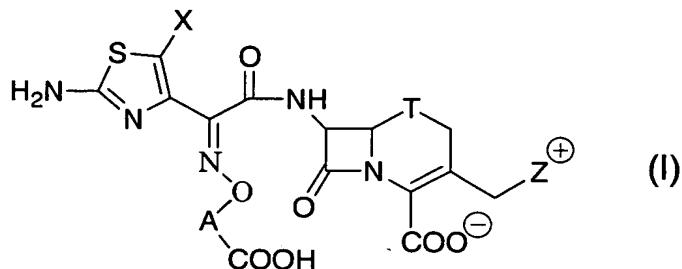


Claims

1. A compound of the formula:



5 (wherein,

T is S, SO or O ;

X is halogen, CN, carbamoyl optionally substituted with lower alkyl, lower alkyl, lower alkoxy, or lower alkylthio ;

10 A is substituted lower alkylene (wherein the substituent is optionally substituted mono lower alkyl, optionally substituted lower alkylidene, or optionally substituted lower alkylene) ;

Z^+ is an optionally substituted, a cation and an N atom-containing heterocyclic group), ester, amino-protected compound wherein the amino bonds to a thiazole ring at the 7-position, or pharmaceutically acceptable salt or solvate thereof.

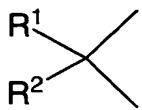
15

2. A compound according to claim 1, wherein T is S, ester, amino-protected compound wherein the amino bonds to a thiazole ring at the 7-position, or pharmaceutically acceptable salt or solvate thereof.

20 3. A compound according to claim 1, wherein T is O, ester, amino-protected compound
wherein the amino bonds to a thiazole ring at the 7-position, or pharmaceutically
acceptable salt or solvate thereof

4. A compound according to claim 1, wherein X is halogen or lower alkyl, ester, 25 amino-protected compound wherein the amino bonds to a thiazole ring at the 7-position, or pharmaceutically acceptable salt or solvate thereof.

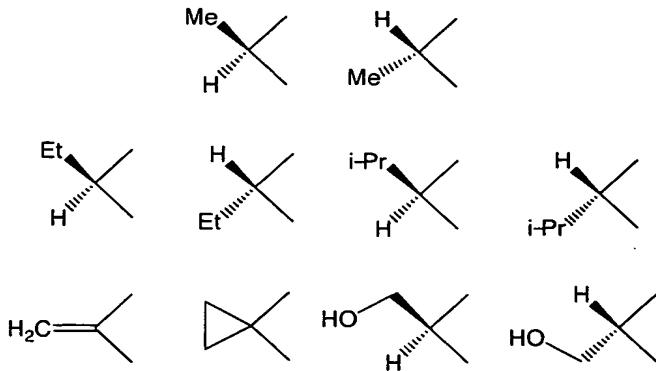
5. A compound according to claim 1, wherein A is of the formula:



(wherein, R¹ and R² are different each other and independently hydrogen or optionally substituted lower alkyl, or taken together may form optionally substituted lower alkylidene or optionally substituted lower alkylene.), ester, amino-protected compound

5 wherein the amino bonds to a thiazole ring at the 7-position, or pharmaceutically acceptable salt or solvate thereof.

6. A compound according to claim 5, wherein A is a divalent group of any of the following formulae, ester, amino-protected compound wherein the amino bonds to a
10 thiazole ring at the 7-position, or pharmaceutically acceptable salt or solvate thereof.

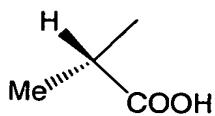


(wherein, Me is methyl ; Et is ethyl ; i-Pr is isopropyl)

15 7. A compound according to claim 5 wherein R¹ and R² are different each other and independently hydrogen or lower alkyl, ester, amino-protected compound wherein the amino bonds to a thiazole ring at the 7-position, or pharmaceutically acceptable salt or solvate thereof.

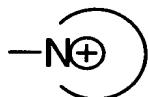
20 8. A compound according to claim 5 wherein R¹ and R² are different each other and independently hydrogen or methyl, ester, amino-protected compound wherein the amino bonds to a thiazole ring at the 7-position, or pharmaceutically acceptable salt or solvate thereof.

25 9. A compound according to claim 5, wherein “-A-COOH” is a group of the formula:



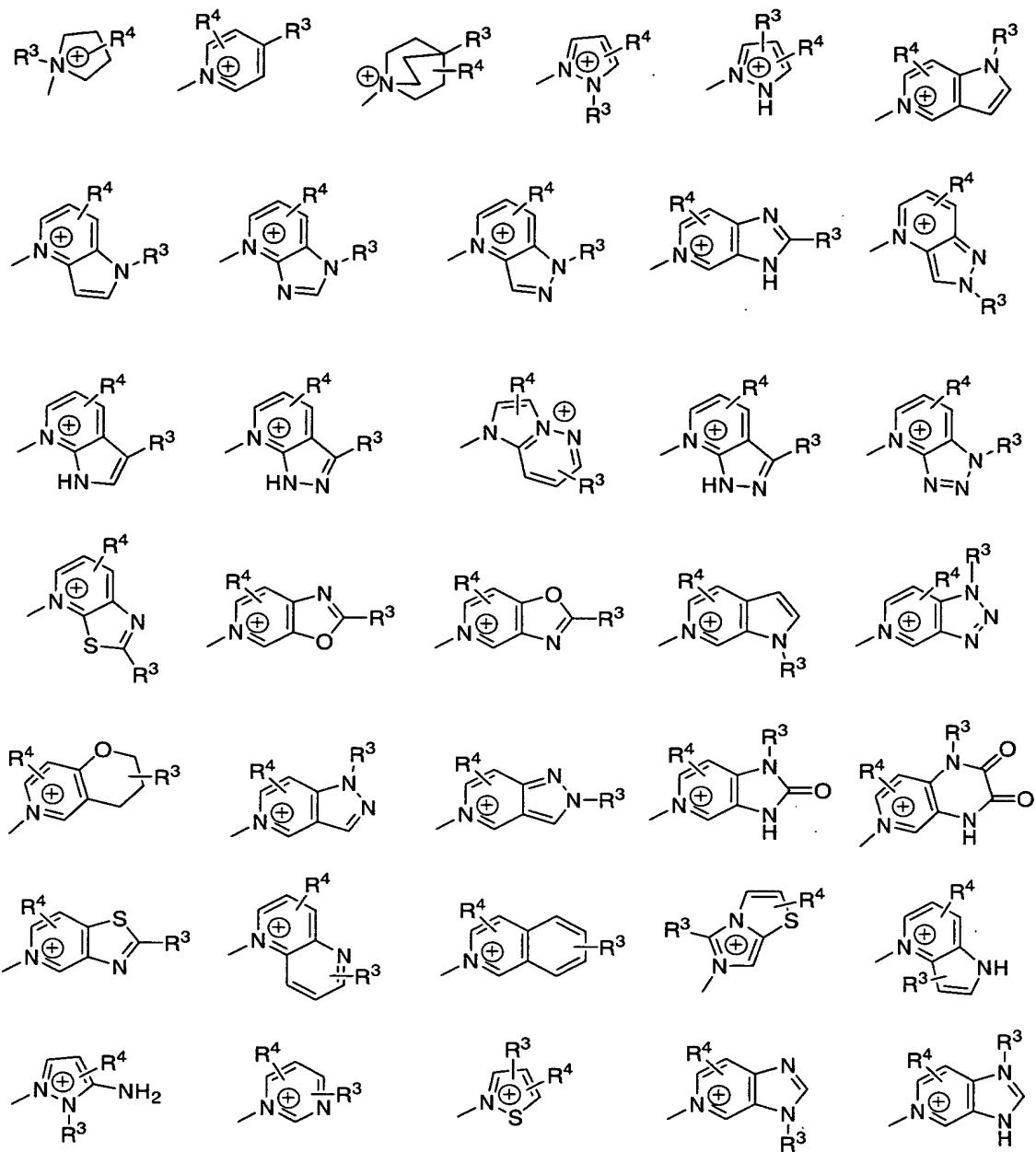
ester, amino-protected compound wherein the amino bonds to a thiazole ring at the 7-position, or pharmaceutically acceptable salt or solvate thereof.

5 10. A compound according to claim 1 wherein Z^+ is a saturated or unsaturated, monocyclic or condensed cyclic, and one or more of N atom-containing quaternary ammonium group of the formula:



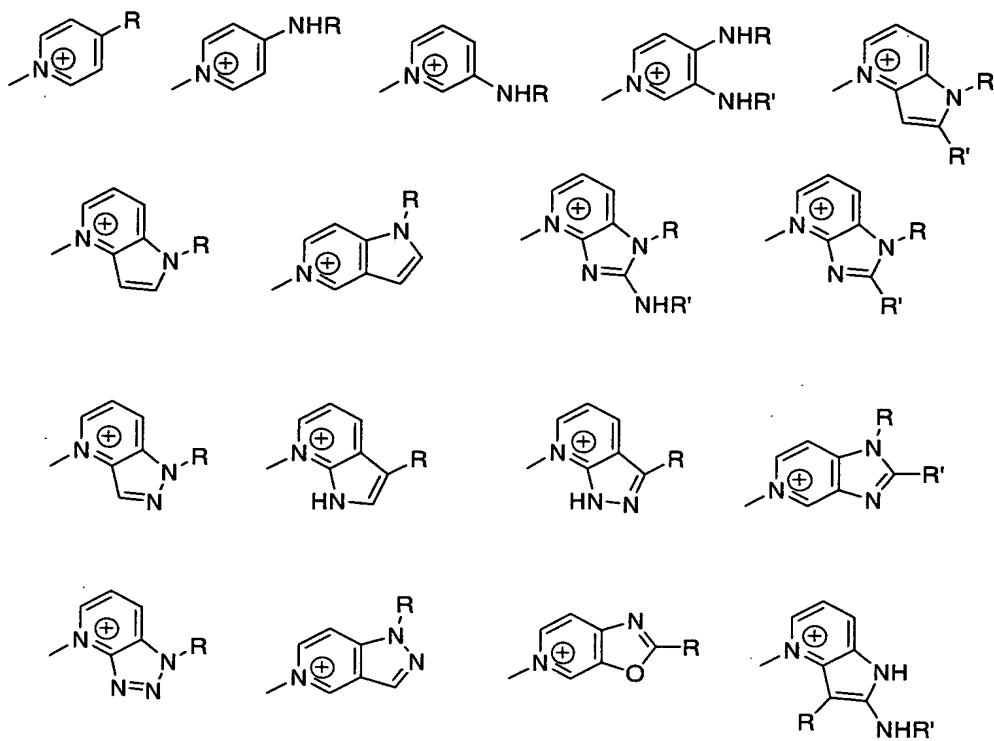
10 which may have 1 to 4 substituents, ester, amino-protected compound wherein the amino bonds to a thiazole ring at the 7-position, or pharmaceutically acceptable salt or solvate thereof.

11. A compound according to claim 1, ester, amino-protected compound wherein the amino bonds to a thiazole ring at the 7-position, or pharmaceutically acceptable salt or solvate thereof, wherein Z^+ is a heterocyclic group of any one of the formulae:



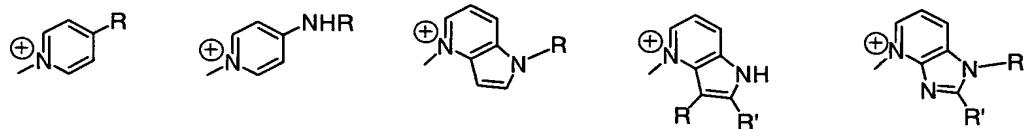
(wherein, R³ and R⁴ each is independently hydrogen, optionally substituted lower alkyl, optionally substituted cycloalkyl, optionally substituted lower alkenyl, optionally substituted amino, hydroxy, halogen, optionally substituted carbamoyl, optionally substituted alkyloxy, or optionally substituted heterocyclic group.)

12. A compound according to claim 1, ester, amino-protected compound wherein the amino bonds to a thiazole ring at the 7-position, or pharmaceutically acceptable salt or solvate thereof, wherein Z⁺ is a heterocyclic group of any one of the formulae:



(wherein, R and R' each is independently hydrogen, lower alkyl, amino, mono- or di-
 lower alkylamino, lower alkenyl, amino lower alkyl, lower alkylamino lower alkyl,
 5 lower alkylamino lower alkylamino, amino lower alkyloxyamino, amino substitute
 with optionally substituted heterocyclic group, hydroxy lower alkyl, hydroxy lower
 alkylamino lower alkyl, lower alkoxy lower alkyl, carbamoyl lower alkyl, carboxy lower
 alkyl, lower alkylcarbonylamino lower alkyl, lower alkoxy carbonylamino lower alkyl,
 lower alkyloxy, the other various optionally substituted lower alkyl, lower alkyl having
 10 2 kinds of substituents, or optionally substituted heterocyclic group.)

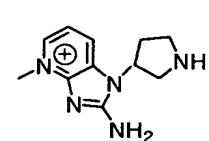
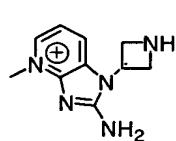
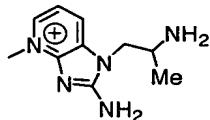
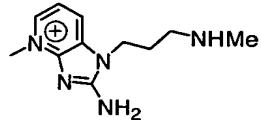
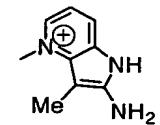
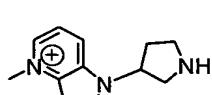
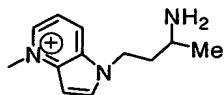
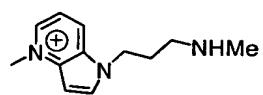
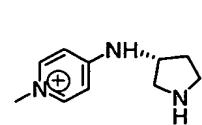
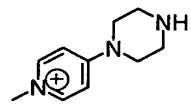
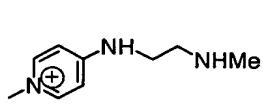
13. A compound according to claim 1, ester, amino-protected compound wherein the amino bonds to a thiazole ring at the 7-position, or pharmaceutically acceptable salt or solvate thereof, wherein Z^+ is a heterocyclic group of any one of the formulae:



15

(wherein, R is independently hydrogen, lower alkyl, amino lower alkyl, lower alkylamino lower alkyl, amino substituted with optionally substituted heterocyclic group, or optionally substituted heterocyclic group ; R' is amino.)

14. A compound according to claim 1, ester, amino-protected compound wherein the amino bonds to a thiazole ring at the 7-position, or pharmaceutically acceptable salt or solvate thereof, wherein Z^+ is a heterocyclic group of any one of the formulae:



5

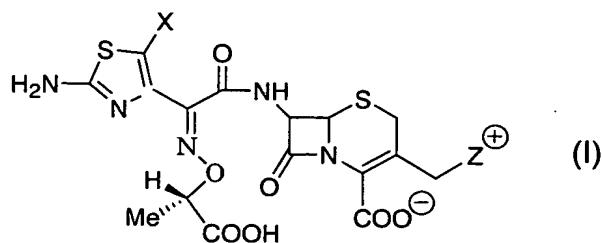
(wherein, Me is methyl.)

15. A compound according to claim 1, ester, amino-protected compound wherein the amino bonds to a thiazole ring at the 7-position, or pharmaceutically acceptable salt or
10 solvate thereof, wherein T is S ; X is halogen ; A is a divalent group shown in any of claims 5 to 9 ; Z^+ is a heterocyclic group shown in any of claims 1 to 14.

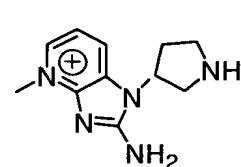
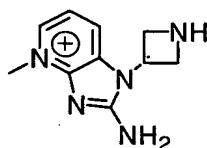
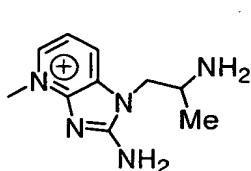
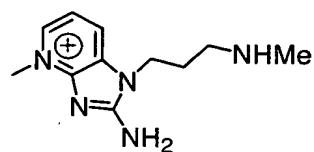
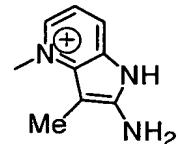
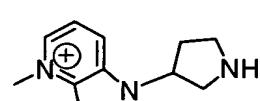
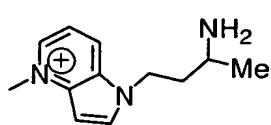
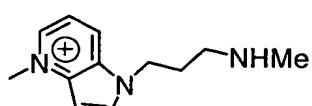
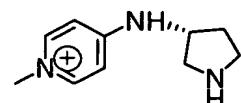
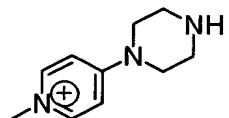
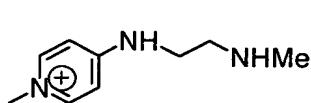
16. A compound according to claim 1, ester, amino-protected compound wherein the amino bonds to a thiazole ring at the 7-position, or pharmaceutically acceptable salt or
15 solvate thereof, wherein T is S ; X is halogen ; A is a divalent group shown in claim 8 ; Z^+ is a heterocyclic group shown in claim 12.

17. A compound according to claim 1, ester, amino-protected compound wherein the amino bonds to a thiazole ring at the 7-position, or pharmaceutically acceptable salt or
20 solvate thereof, wherein T is S ; X is halogen ; A is a divalent group shown in claim 9 ; Z^+ is a heterocyclic group shown in claim 13 or 14.

18. A compound according to claim 1, of the following formula, or pharmaceutically acceptable salt or solvate thereof.



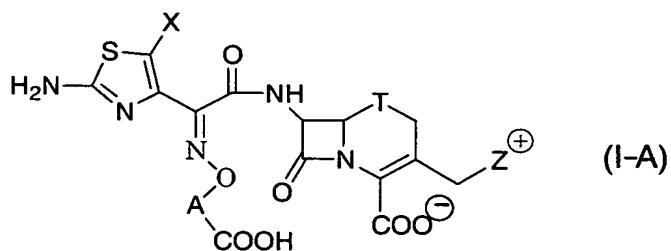
(wherein, X is halogen ; Z⁺ is a heterocyclic group of any of the formulae)



5

(wherein, Me is methyl)

19. A compound of the formula :



10

(wherein,

T is S, SO or O ;

X is halogen, CN, carbamoyl optionally substituted with lower alkyl, lower alkyl, lower alkoxy, or lower alkylthio ;

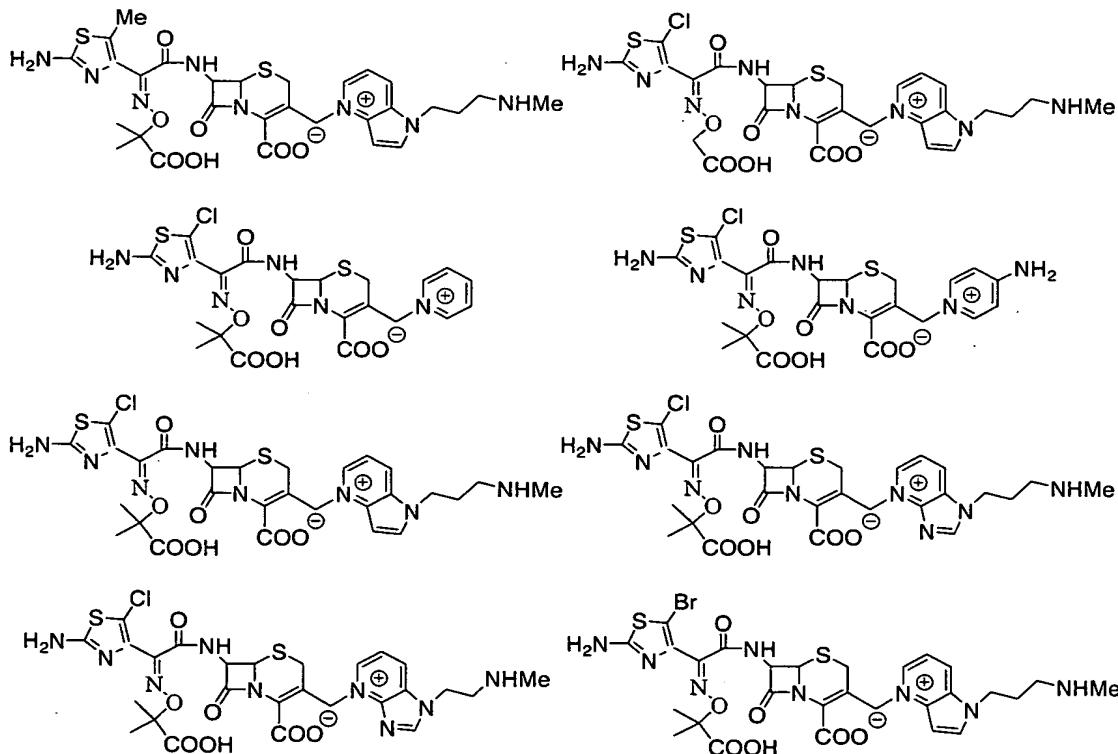
A is optionally substituted lower alkylene (excluding that the substituent is optionally substituted mono lower alkyl, optionally substituted lower alkylidene, or optionally substituted lower alkylene) ;

Z⁺ is optionally substituted, a cation- and an N atom-containing heterocyclic group),

5 ester, amino-protected compound wherein the amino bonds to a thiazole ring at the 7-position, or pharmaceutically acceptable salt or solvate thereof, excluding that T is S ; X is halogen and 1) A is methylene ; Z⁺ is pyridinium or 2) A is dimethylmethylen ; Z⁺ is imidazo[1, 2-a]pyridinium).

10 20. A compound of claim 19, ester, amino-protected compound wherein the amino bonds to a thiazole ring at the 7-position, or pharmaceutically acceptable salt or solvate thereof, wherein T is S, X is halogen or lower alkyl ; A is methylene optionally substituted with di-lower alkyl.

15 21. A compound of claim 20, ester, amino-protected compound wherein the amino bonds to a thiazole ring at the 7-position, or pharmaceutically acceptable salt or solvate thereof, of any of the formula:



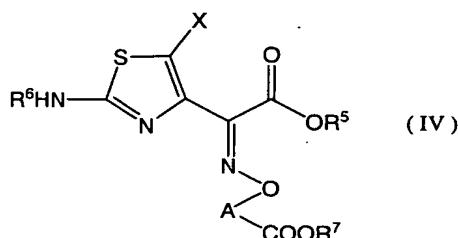
20 22. A pharmaceutical composition containing a compound of any one of claims 1 to 21,

ester, amino-protected compound wherein the amino bonds to a thiazole ring at the 7-position, or pharmaceutically acceptable salt or solvate thereof.

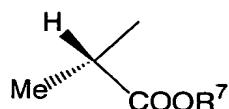
23. An antibacterial composition containing a compound of any one of claims 1 to 21,

5 ester, amino-protected compound wherein the amino bonds to a thiazole ring at the 7-position, or pharmaceutically acceptable salt or solvate.

24. A compound or pharmaceutically acceptable salt, of the formula:



10 (wherein, X is halogen, CN, carbamoyl optionally substituted with lower alkyl, lower alkyl, lower alkoxy, or lower alkylthio ; A is of the formula :



R^5 is hydrogen or carboxy-protecting group ; R^6 is hydrogen or amino-protecting group ; R^7 is hydrogen or carboxy-protecting group)

15

25. A compound or pharmaceutically acceptable salt according to claim 24, wherein X is halogen or lower alkyl.

20 26. A compound or pharmaceutically acceptable salt according to claim 24, wherein X is halogen.